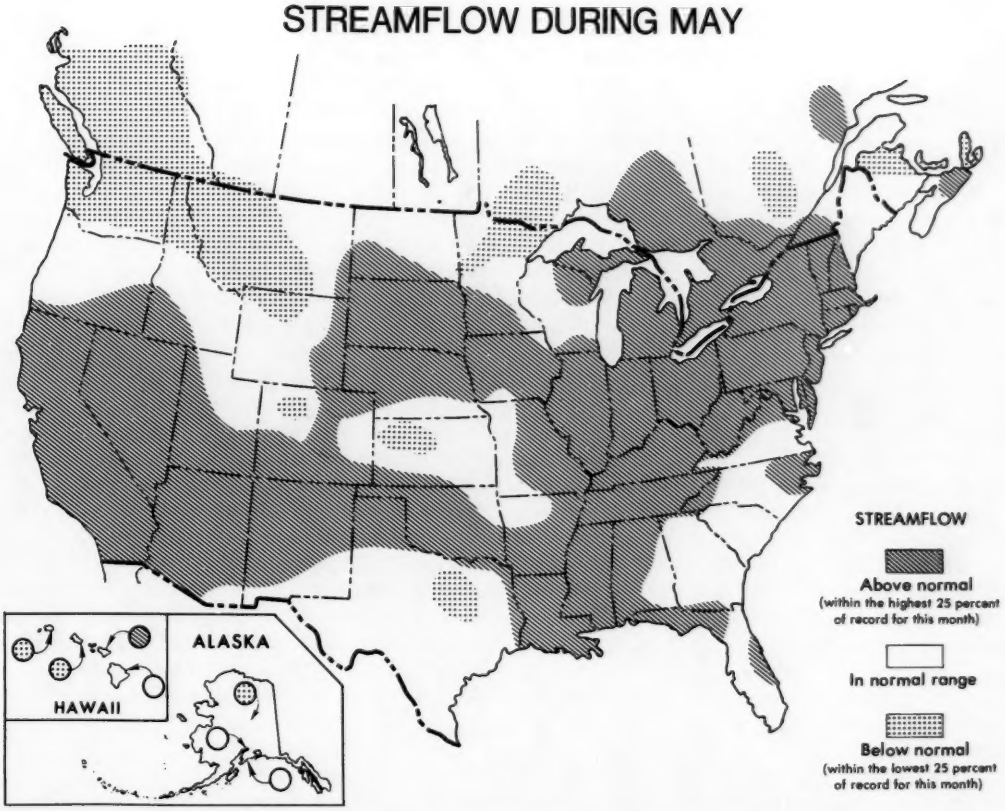
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

MAY 1983

STREAMFLOW DURING MAY



Streamflow remained in the normal range or above that range in most of the United States and southern Canada during May. Monthly and/or daily mean flows were highest of record for the month in parts of at least 14 states. Areas in Alabama, Mississippi, Louisiana, Texas, and Tennessee suffered severe flooding during the latter part of the month, and at month's end, floods and disastrous mudslides occurred in parts of Nevada and Utah.

Below-normal flows persisted in parts of Hawaii, central Texas, and southwestern Ontario, and decreased into that range in western Kansas, northwestern Colorado, central Alaska, northern Minnesota, parts of southeastern Canada, and a large area in the Pacific Northwest.

STREAMFLOW CONDITIONS DURING MAY 1983

Streamflow was in the above-normal range during May in most of the Mississippi River basin, the Northeastern States except for Maine, parts of southeastern Canada, and in parts of most States in the Southwest. Flows remained in the above-normal range in parts of at least 31 States and monthly and/or daily mean flows were highest of record for the month in parts of 14 States. (See table on page 3.) For example, in western Mississippi, the monthly mean flow of 24,380 cubic feet per second (cfs) at Big Black River near Bovina (drainage area, 2,810 square miles) was highest for May in 47 years of record. The daily mean flow of 94,000 cfs on May 24 was highest for any day during that record period. Similarly, the monthly mean flow of 91,600 cfs and the daily mean flow of 275,000 cfs on May 27 at Tombigbee River at Demopolis Lock and Dam near Coatopa, Alabama (drainage area, 15,400 square miles) were highest of record for May in 55 years of record. (See graph on page 11.) By contrast, below-normal streamflow persisted in parts of Ontario, Hawaii, Washington, northern Idaho, and central Texas, and flows decreased into that range in western Montana, northern Minnesota, western Kansas, central Alaska, and parts of southern Canada. In northern Nova Scotia, the monthly mean discharge of 463 cfs and the daily mean flow of 286 cfs on May 20 were lowest for May in record that began in 1916. Daily mean flows were also lowest of record for May in parts of New Hampshire and Utah.

Severe flooding continued to plague parts of Mississippi where damages from flooding, tornados, and heavy rains were estimated at $48.9 million in nine counties. At Jackson, the Pearl River reached its second highest level in history, flooding 1,000 homes and businesses, left about 5,000 people homeless, and caused an estimated $24.4 million damage. Similarly, the Mississippi River at Vicksburg flooded over 300 homes, left about 1,200 people homeless and caused an estimated $10.3 million damage. Precipitation during May was the sixth heaviest in history at Jackson and only about 1.4 inches short of the record for May, according to the National Weather Service.

In Utah, snowmelt runoff from a massive snowpack was causing some record high streamflows at month's end. Mudslides in Farmington and Fairview demolished several homes and damaged a number of others. The Surplus Canal at Salt Lake City, as of May 31, 1983, was transporting 2,900 cfs, which exceeds last fall's record flow of 2,560 cfs. Great Salt Lake continued to rise and was at an elevation of 4,204.30 feet above sea level at month's end, the highest elevation since 1924.

In Nevada, snowmelt runoff from the record high snowpack occurred near monthend and caused minor flooding along the Walker, Humboldt, and Carson Rivers. A disastrous mudslide occurred on May 30, 1983 in the Ophir Creek drainage in Washoe County, which emptied Upper and Lower Price Lakes, destroyed several homes, and was responsible for at least one death.

In New York, runoff from heavy rains that continued into the first week of May resulted in the Great Sacandaga Lake spilling over the Conklingville Dam for the first time in its 53-year history. Below the dam on the Sacandaga River, a new peak discharge record of 13,000 cfs was reached. When coupled with the seasonally high flow of the Hudson River, a sustained period of high flow not seen since March 1936 was experienced along the length of the Hudson River from its confluence with the Sacandaga River at Hadley, to the Federal Dam at Green Island.

Elsewhere in the Nation, floods with recurrence intervals that ranged from 2 to 10 years occurred at midmonth in a 100-mile wide band west of Nashville, Tennessee, extending north to south across the State. In Indiana, widespread flooding occurred in early May but recurrence intervals for peak discharges were generally less than 10 years. Early in the month, flash flooding caused the evacuation of several hundred people as a result of overflows from Panther Creek in Owensboro and Canoe Creek

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NEW MAXIMUMS DURING MAY 1983 AT STREAMFLOW INDEX STATIONS

Station number	Stream and place of determination	Drainage area (square miles)	Years of record	Previous May maximums (period of record)		May 1983			
				Monthly mean in cfs (year)	Daily mean in cfs (year)	Monthly mean in cfs	Percent of median	Daily mean in cfs	Day
01117500	Pawcatuck River at Wood River Junction, R.I.	100	43	437 (1958)	937 (1979)	466	196	980	1
01357500	Mohawk River at Cohoes, N.Y . . .	3,456	66	15,080 (1972)	41,800 (1972)	13,300	199	46,100	2
01645000	Seneca Creek at Dawsonville, Md.	101	53	243 (1952)	1,470 (1978)	255	243	1,350	23
02232500	St. Johns River near Christmas, Fla.	1,539	50	1,543 (1959)	2,510 (1959)	1,720	583	.....	...
02467000	Tombigbee River at Demopolis L&D near Demopolis, Ala.	15,400	55	55,070 (1953)	105,000 (1964)	91,600	416	275,000	27
02489500	Pearl River near Bogalusa, La	6,630	45	36,930 (1953)	56,500 (1980)	24,000	233	68,300	31
03106000	Connoquenessing Creek near Zelienople, Penn.	356	64	1,210 (1968)	7,800 (1923)	1,480	374	.....	...
03253500	Licking River at Catawba, Ky	3,300	57	13,300 (1935)	72,300 (1961)	16,690	596	55,900	4
03294500	Ohio River at Louisville, Ky.	91,170	55	301,900 (1958)	587,000 (1961)	332,300	253	521,700	4
03308500	Green River at Munfordville, Ky . .	1,673	57	8,028 (1967)	24,300 (1968)	16,920	929	29,000	17
03434500	Harpeth River near Kingston Springs, Tenn.	681	59	2,869 (1979)	25,500 (1979)	4,770	636	23,100	19
03574500	Paint Rock River near Woodville, Ala.	320	48	1,503 (1966)	8,430 (1969)	2,050	306	14,600	20
03604500	Buffalo River near Lobelville, Tenn.	707	56	3,972 (1933)	25,700 (1967)	4,820	463	16,100	20
05464500	Cedar River at Cedar Rapids, Iowa.	6,510	81	14,020 (1973)	52,450 (1903)	15,600	365	29,200	24
05480500	Des Moines River at Fort Dodge, Iowa.	4,190	51	6,061 (1951)	16,100 (1951)	7,932	446	13,200	3
06485500	Big Sioux River at Akron, Iowa . . .	9,030	55	3,661 (1972)	8,130 (1979)	5,020	585	9,350	5
07290000	Big Black River near Bovina, Miss.	2,810	47	17,730 (1958)	51,800 (1958)	24,380	655	94,000	24
10234500	Beaver River near Beaver, Utah . . .	91	70	384 (1937)	693 (1937)	274	261	1,000	29
10296000	West Walker River Below Little Walker River, near Coleville, Calif.	180	45	1,655 (1969)	2,450 (1969)	997	137	2,550	30
11098000	Arroyo Seco near Pasadena, Calif.	16	73	31.9 (1967)	141 (1921)	63	1,511	131	1
11425500	Sacramento River at Verona, Calif.	21,257	57	53,730 (1938)	56,300 (1952)	51,609	293	62,600	8

in Henderson, Kentucky. In North Carolina, runoff from intense rains on May 19-21 caused flooding on small streams in the eastern Piedmont and minor lowland flooding on the Neuse River at Smithfield. In Colorado, streamflows were near record highs at monthend as a result of snowmelt runoff, mostly from melting snow at lower elevations. Similarly, lowland flooding occurred at monthend along the North Platte, South Platte, and Platte Rivers due to mountain snowmelt and reservoir releases.

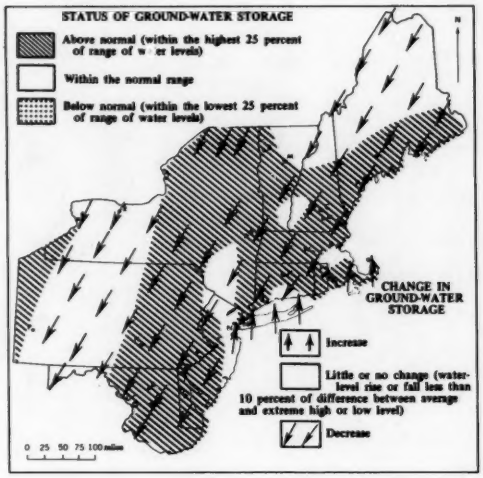
Storage in most major reservoirs in the United States and southern Canada was above average at end of May 1983.

GROUND-WATER CONDITIONS DURING MAY 1983

Ground-water levels generally declined in the Northeast, ending the seasonal rising trend of March and April. However, levels remained above average in much of the region, including most of central and southern New England, Maryland, Delaware, and much of eastern New York, and Pennsylvania. (See map.) In Connecticut and Rhode Island, although levels generally declined, the levels near end of May in some wells were the highest for that month in the past 30 to 40 years because of carryover from the record-breaking high levels that occurred in April when aquifers were recharged by excessive rainfall.

In the southeastern States, ground-water levels rose in Kentucky and Arkansas, and declined in Alabama and in much of West Virginia, North Carolina, Louisiana, Mississippi, and Georgia. Trends were mixed in Virginia and Florida. Water levels were above average in Kentucky, Virginia, North Carolina, and Alabama, and were mixed with respect to average in other States. A new low ground-water level for May was reached in Louisiana. A new all-time high level occurred in Kentucky in 32 years of record.

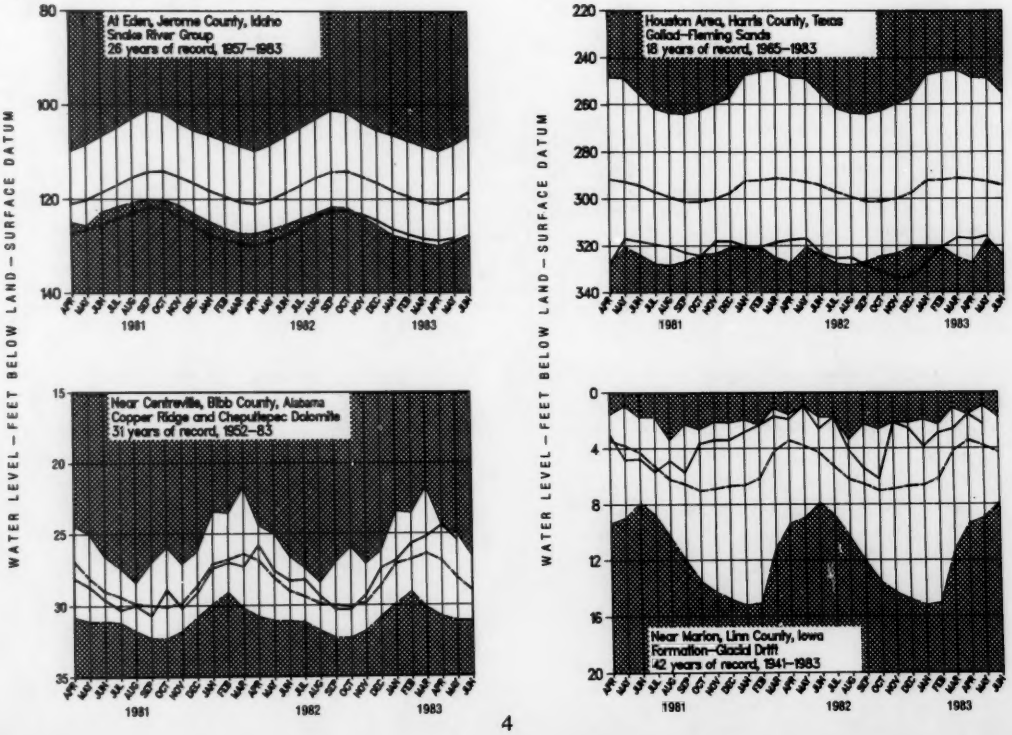
In the central and western Great Lakes States, water levels generally rose in Wisconsin, Michigan, and Ohio, and declined in Minnesota and Iowa. Levels were average


STATUS OF GROUND-WATER STORAGE
Above normal (within the highest 25 percent of range of water levels)
Within the normal range
Below normal (within the lowest 25 percent of range of water levels)
CHANGE IN GROUND-WATER STORAGE
Increase
Little or no change (water-level rise or fall less than 10 percent of difference between average and extreme high or low level)
Decrease
0 25 50 75 100 miles

Map shows ground-water storage near end of May and change in ground-water storage from end of April to end of May.

MONTH-END GROUND-WATER LEVELS IN KEY WELLS

Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates average of monthly levels in previous years. Heavy line indicates level for current period.


At Eden, Jerome County, Idaho
Snake River Group
26 years of record, 1957–1983
Houston Area, Harris County, Texas
Gulfad–Fleming Sands
18 years of record, 1965–1983
Near Centreville, Bibb County, Alabama
Copper Ridge and Chepultepec Dolomite
31 years of record, 1952–83
Near Marion, Linn County, Iowa
Formation–Glacial Drift
42 years of record, 1941–1983
WATER LEVEL – FEET BELOW LAND – SURFACE DATUM
1981
1982
1983

WATER LEVELS IN KEY OBSERVATION WELLS IN SOME REPRESENTATIVE AQUIFERS IN THE CONTERMINOUS UNITED STATES MAY 1983

Aquifer and location	Current water level in feet below land-surface datum	Departure from average in feet	Net change in water level in feet since:		Year records began	Remarks
			Last month	Last year		
Glacial drift at Hanska, south-central Minnesota	-2.76	+2.84	-0.94	+1.78	1943	May high.
Glacial drift at Roscommon in north-central part of Lower Peninsula, Michigan	-2.98	+0.99	+0.23	+0.82	1935	May high.
Glacial drift at Marion, Iowa	-2.22	+1.51	-0.66	-1.29	1941	
Glacial drift at Princeton in northwestern Illinois	-7.30	+0.63	-1.32	+0.70	1943	
Petersburg Granite, southeastern Piedmont near Fall Zone, Colonial Heights, Virginia	-13.52	+1.32	-1.75	+1.16	1939	
Glacial outwash sand and gravel, Louisville, Kentucky	-17.70	+7.86	+1.18	+0.56	1946	
500-foot sand aquifer near Memphis, Tennessee (U.S. well no. 2)	-101.32	-13.50	+0.27	+1.86	1941	
Granite in eastern Piedmont Province, Chapel Hill, North Carolina	-38.03	+3.35	+1.05	+4.26	1931	
Sparta Sand in Pine Bluff industrial area, Arkansas	-229.90	-25.17	+0.20	+7.05	1958	
Copper Ridge and Chepultepec Dolomites, Centreville, Alabama	-25.4	+2.6	-1.0	+2.2	1952	
Limestone aquifer on Cockspur Island, Savannah area, Georgia	-21.80	-4.09	-0.75	+2.00	1956	
Sand and gravel in Puget Trough, Tacoma, Washington	-100.13	+9.62	+0.35	+1.61	1952	
Pleistocene glacial outwash gravel, North Pole, northern Idaho (U.S. well no. 3)	-455.5	+5.3	+1.0	+3.9	1929	
Snake River Group: southwestern Snake River Plain aquifer, at Eden, Idaho	-128.3	-8.1	+0.5	+0.5	1957	
Terrace gravel at Missoula, Montana	-17.10	+2.90	-2.60	+2.90	1960	
Alluvial sand and gravel, Platte River Valley, Nebraska (U.S. well no. 6)	-2.27	+2.04	-0.18	-2.07	1935	
Alluvial valley fill in Steptoe Valley, Nevada	-9.42	+3.50	+0.05	+0.87	1950	May high.
Ogallala Formation, Kansas Agricultural Experiment Station at Colby in the High Plains of northwestern Kansas	-124.23	-7.53	0.11	+0.37	1947	
Alluvium and Paso Robles, clay, sand, and gravel, Santa Maria Valley, California	-122.05	+23.10	+17.93	+3.55	1957	
Valley fill, Elfrida area, Douglas, Arizona (U.S. well no. 15)	-111.3	-33.47	-1.0	+0.4	1951	
Berrendo-Smith well in San Andres Limestone, Roswell artesian basin of Pecos Valley, New Mexico (U.S. well no. 1-A)	-62.24	+1.52	-1.79	+1.71	1966	
Hueco bolson, El Paso area, Texas	-260.01	-14.83	-0.27	+0.43	1965	
Evangeline aquifer, Houston area, Texas	-315.71	-22.14	+1.41	+1.2	1965	

or above average in all the States. A new high ground-water level for May occurred in Minnesota, despite a net decline in the well at Hanska in which it was recorded; new high levels for May also were recorded in wells in Michigan and Iowa.

In the western States, ground-water levels rose in Montana and declined in New Mexico. Trends were mixed in other States. Levels were above average in Washington, Nebraska, and southern California, and below average in Montana. Levels were above and below average in other States. New high ground-water levels for May occurred in Idaho and Nevada, and a new low for May was recorded in Arizona. A new alltime high level was reached in southern California in 33 years of record.

USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF MAY 1983

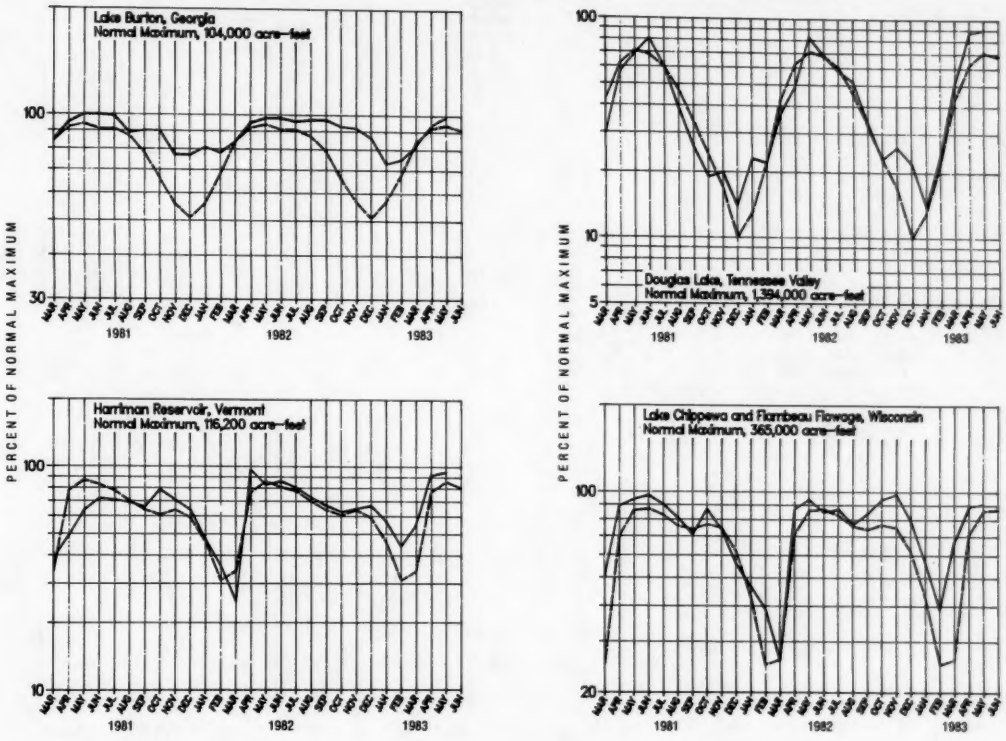
[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

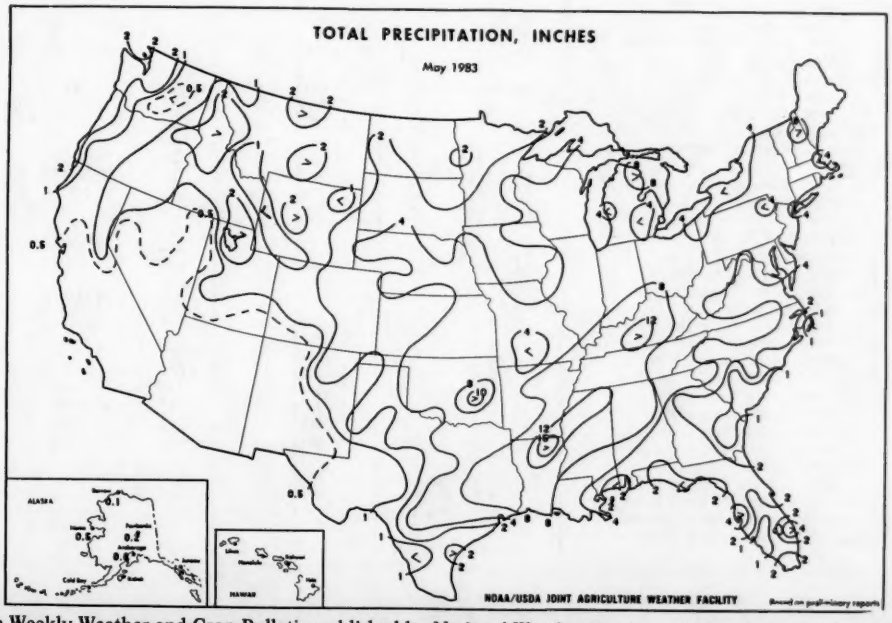
Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	Percent of normal maximum				Normal maximum (acre-feet)[a]
	End of May 1983	End of May 1982	Average for end of May	End of Apr. 1983	
NORTHEAST REGION					
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs (P)	77	86	77	69	[b]226,300
QUEBEC					
Allard (P)	91	137	87	99	280,600
Gouin (P)	84	68	64	63	6,954,000
MAINE					
Seven reservoir systems (MP)	101	94	90	95	4,098,000
NEW HAMPSHIRE					
First Connecticut Lake (P)	93	92	87	54	76,450
Lake Francis (FPR)	97	89	82	72	99,310
Lake Winnipesaukee (PR)	105	105	101	101	165,700
VERMONT					
Harriman (P)	94	83	86	92	116,200
Somerset (P)	98	87	86	81	57,390
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	92	92	90	94	77,920
NEW YORK					
Great Sacandaga Lake (FPR)	101	98	97	109	786,700
Indian Lake (FMP)	100	88	103	90	103,300
New York City reservoir system (MW)	100	96	...	100	1,680,000
NEW JERSEY					
Wanaque (M)	102	99	95	102	85,100
PENNSYLVANIA					
Allegheny (FPR)	44	50	47	44	1,180,000
Pymatuning (FMR)	102	101	99	98	188,000
Raystown Lake (FR)	68	68	59	59	761,900
Lake Wallenpaupack (PR)	79	84	78	79	157,800
MARYLAND					
Baltimore municipal system (M)	100	83	94	95	255,800
SOUTHEAST REGION					
NORTH CAROLINA					
Bridgewater (Lake James) (P)	94	95	92	98	288,800
Narrows (Badin Lake) (P)	92	99	100	100	128,900
High Rock Lake (P)	84	97	83	100	234,800
SOUTH CAROLINA					
Lake Murray (P)	96	95	83	93	1,614,000
Lakes Marion and Moultrie (P)	87	84	79	90	1,862,000
SOUTH CAROLINA–GEORGIA					
Clark Hill (FP)	85	79	76	82	1,730,000
GEORGIA					
Burton (PR)	98	98	94	93	104,000
Sinclair (MPR)	88	89	93	87	214,000
Lake Sidney Lanier (FMPR)	68	61	66	67	1,686,000
ALABAMA					
Lake Martin (P)	100	99	95	98	1,373,000
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	80	60	65	63	2,229,300
Douglas Lake (FPR)	90	83	72	87	1,394,000
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	92	79	83	86	1,012,000
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	88	67	70	74	2,880,000
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	97	78	84	89	1,478,000
WESTERN GREAT LAKES REGION					
WISCONSIN					
Chippewa and Flambeau (PR)	91	94	86	89	365,000
Wisconsin River (21 reservoirs) (PR)	91	91	81	82	399,000
MINNESOTA					
Mississippi River headwater system (FMR)	28	43	37	27	1,640,000
MIDCONTINENT REGION					
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	84	77	86	80	22,700,000
SOUTH DAKOTA					
Angostura (I)	95	115	90	95	127,600
Belle Fourche (I)	96	92	73	96	185,200
Lake Francis Case (FIP)	74	83	83	76	4,834,000
Lake Oahe (FIP)	97	75	...	94	22,530,000
MIDCONTINENT REGION—Continued					
SOUTH DAKOTA—Continued					
Lake Sharpe (FIP)	101	101	100	102	1,725,000
Lewis and Clarke Lake (FIP)	80	92	85	76	477,000
NEBRASKA					
Lake McConaughy (IP)	98	85	80	86	1,948,000
OKLAHOMA					
Eufaula (FPR)	109	121	95	105	2,378,000
Keystone (FPR)	71	158	109	89	661,000
Tenkiller Ferry (FPR)	110	104	102	112	628,200
Lake Altus (FIMR)	75	60	67	71	133,000
Lake O'The Cherokees (FPR)	105	96	93	119	1,492,000
OKLAHOMA–TEXAS					
Lake Texoma (FMPRW)	103	130	103	96	2,722,000
TEXAS					
Bridgeport (IMW)	87	104	52	90	386,400
Canyon (FMR)	93	98	80	91	385,600
International Amistad (FIMPW)	84	101	83	85	3,497,000
International Falcon (FIMPW)	36	97	68	57	2,668,000
Livingston (IMW)	105	101	89	100	1,788,000
Possum Kingdom (IMPRW)	93	95	99	84	570,200
Red Bluff (PI)	14	16	26	16	307,000
Toledo Bend (P)	103	97	91	94	4,472,000
Twin Buttes (FIM)	31	51	32	35	177,800
Lake Kemp (IMW)	87	76	89	89	268,000
Lake Meredith (FWM)	52	32	35	53	796,900
Lake Travis (FIMPRW)	95	97	83	86	1,144,000
THE WEST					
WASHINGTON					
Ross (PR)	45	39	58	25	1,052,000
Franklin D. Roosevelt Lake (IP)	33	38	75	10	5,022,000
Lake Chelan (PR)	71	52	74	38	676,100
Lake Cushman (PR)	100	100	96	92	359,500
Lake Merwin (P)	100	102	104	100	245,600
IDAHO					
Boise River (4 reservoirs) (FIP)	80	80	81	63	1,235,000
Coeur d'Alene Lake (P)	104	142	125	94	238,500
Pend Oreille Lake (FP)	79	89	82	63	1,561,000
IDAHO–WYOMING					
Upper Snake River (8 reservoirs) (MP)	86	69	78	85	4,401,000
WYOMING					
Boysen (FIP)	73	55	65	65	802,000
Buffalo Bill (IP)	73	52	74	69	421,300
Keyhole (F)	45	28	51	35	193,800
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	81	52	58	69	3,056,000
COLORADO					
John Martin (FIR)	25	7	14	29	364,400
Taylor Park (IR)	37	27	71	39	106,200
Colorado–Big Thompson project (I)	66	48	63	58	722,600
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	94	82	...	88	31,620,000
UTAH–IDAHO					
Bear Lake (IPR)	90	81	69	77	1,421,000
CALIFORNIA					
Folsom (FIP)	76	97	88	70	1,000,000
Hetch Hetchy (MP)	40	79	69	47	360,400
Isabella (FIR)	69	86	45	70	568,100
Pine Flat (FI)	46	88	73	58	1,001,000
Clair Engle Lake (Lewiston) (P)	91	98	91	87	2,438,000
Lake Almanor (P)	89	108	65	87	1,036,000
Lake Berryessa (FIMW)	101	100	87	102	1,600,000
Millerton Lake (FI)	32	77	79	36	503,200
Shasta Lake (FIPR)	102	104	91	94	4,377,000
CALIFORNIA–NEVADA					
Lake Tahoe (IPR)	68	89	68	77	744,600
NEVADA					
Rye Patch (I)	90	62	67	89	194,300
ARIZONA–NEVADA					
Lake Mead and Lake Mohave (FIMP)	94	87	70	94	27,970,000
ARIZONA					
San Carlos (IP)	65	111	20	63	1,073,000
Salt and Verde River system (IMPR)	96	88	51	94	2,073,000
NEW MEXICO					
Conchas (FIR)	82	39	79	80	330,100
Elephant Butte and Caballo (FIPR)	50	33	31	44	2,453,000

[a]1 acre-foot = 0.0436 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second day.
[b]Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS, MARCH 1981 TO MAY 1983

Dashed line indicates average of month-end contents. Solid line indicates current period.





(From Weekly Weather and Crop Bulletin published by National Weather Service and Department of Agriculture.)

FLOW OF LARGE RIVERS DURING MAY 1983

Station number	Stream and place of determination	Drainage area (square miles)	Mean annual discharge through September 1980 (cubic feet per second)	May 1983					
				Monthly mean discharge (cubic feet per second)	Percent of median monthly discharge, 1951–80	Change in discharge from previous month (percent)	Discharge near end of month		
							Cubic feet per second	Million gallons per day	Date
01014000	St. John River below Fish River at Fort Kent, Maine	5,690	9,647	37,210	110	-20	22,300	14,410	31
01318500	Hudson River at Hadley, N.Y	1,664	2,909	8,780	176	+15	7,000	4,500	31
01357500	Mohawk River at Cohoes, N.Y	3,456	5,734	13,300	199	-38	7,800	5,040	31
01463500	Delaware River at Trenton, N.J	6,780	11,750	19,300	153	-57	17,200	11,120	31
01570500	Susquehanna River at Harrisburg, Pa	24,100	34,530	70,200	167	-34	38,200	24,690	31
01646500	Potomac River near Washington, D.C.	11,560	[1] 11,490	25,000	179	-49	16,000	10,300	31
02105500	Cape Fear River at William O. Huske Lock near Tarheel, N.C.	4,810	5,005	4,500	134	-63	3,300	2,130	30
02131000	Pee Dee River at Peedee, S.C	8,830	9,851	11,400	150	-61	9,790	6,327	27
02226000	Altamaha River at Doctortown, Ga	13,600	13,880	13,450	110	-72	7,470	4,827	31
02320500	Suwannee River at Branford, Fla	7,880	6,987	19,300	292	-24	10,400	6,720	31
02358000	Apalachicola River at Chattahoochee, Fla	17,200	22,570	21,840	108	-66	15,960	10,315	31
02467000	Tombigbee River at Demopolis lock and dam near Coatopa, Ala	15,400	23,300	91,600	415	-13	120,000	78,000	31
02489500	Pearl River near Bogalusa, La	6,630	9,768	24,000	233	-59	68,300	44,140	31
03049500	Allegheny River at Natrona, Pa	11,410	[1] 19,480	38,420	181	+36	45,100	29,150	25
03085000	Monongahela River at Braddock, Pa.	7,337	[1] 12,510	30,010	213	+4	35,200	22,750	25
03193000	Kanawha River at Kanawha Falls, W. Va	8,367	12,590	18,830	146	-40	25,300	16,350	25
03234500	Scioto River at Higby, Ohio	5,131	4,547	14,940	317	+127	4,200	2,710	29
03294500	Ohio River at Louisville, Ky[2]	91,170	116,000	332,300	253	+46	333,000	215,200	25
03377500	Wabash River at Mount Carmel, Ill	28,635	27,220	94,800	297	+49	37,000	23,900	31
03469000	French Broad River below Douglas Dam, Tenn	4,543	6,798	11,900	177	-35	.....	.....	...
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wis[2]	6,150	4,163	4,500	79	0	.....	.....	...
04264331	St. Lawrence River at Cornwall, Ontario–near Massena, N.Y[3]	299,000	242,700	281,400	101	+2	302,000	195,200	31
050115	St. Maurice River at Grand Mere, Quebec	16,300	25,150	48,600	71	+35	81,700	52,800	31
05082500	Red River of the North at Grand Forks, N. Dak	30,100	2,551	2,799	74	-61	2,890	1,867	22
05133500	Rainy River at Manitou Rapids, Minn.	19,400	12,830	7,660	42	-36	7,360	4,756	23
05330000	Minnesota River near Jordan, Minn.	16,200	3,402	16,239	295	-34	9,000	5,800	31
05331000	Mississippi River at St. Paul, Minn	36,800	[1] 10,610	28,019	126	-37	19,500	12,600	31
05365500	Chippewa River at Chippewa Falls, Wis	5,600	5,100	6,959	114	-26	4,100	2,650	31
05407000	Wisconsin River at Muscoda, Wis	10,300	8,617	12,809	115	-19	15,284	9,878	31
05446500	Rock River near Joslin, Ill	9,551	5,873	11,300	166	-41	13,500	8,730	31
05474500	Mississippi River at Keokuk, Iowa	119,000	62,620	150,600	155	-24	150,100	97,010	30
06214500	Yellowstone River at Billings, Mont	11,796	7,038	9,169	69	+160	28,500	18,420	31
06934500	Missouri River at Hermann, Mo	524,200	79,490	209,290	227	-9	209,000	135,100	26
07289000	Mississippi River at Vicksburg, Miss[4]	1,140,500	576,600	1,599,300	188	+35	1,771,000	1,144,600	30
07331000	Washita River near Dickson, Okla.	7,202	1,368	5,364	321	+285	5,320	3,438	25
08276500	Rio Grande below Taos Junction Bridge, near Taos, N. Mex	9,730	725	2,049	231	+105	5,000	3,200	31
09315000	Green River at Green River, Utah.	40,600	6,298	15,652	135	+132	34,000	22,000	31
11425500	Sacramento River at Verona, Calif	21,257	18,820	51,609	293	-2	35,000	22,600	31
13269000	Snake River at Weiser, Idaho	69,200	18,050	43,700	168	+4	55,200	35,680	31
13317000	Salmon River at White Bird, Idaho	13,550	11,250	29,300	92	+184	88,000	56,900	30
13342500	Clearwater River at Spalding, Idaho	9,570	15,480	33,600	67	+87	48,200	31,150	30
14105700	Columbia River at The Dalles, Oreg[5]	237,000	193,100	415,600	97	+84	394,200	254,780	29
14191000	Willamette River at Salem, Oreg.	7,280	23,510	21,000	90	-43	17,300	11,180	29
15515500	Tanana River at Nenana, Alaska.	25,600	23,460	24,290	82	+190	18,000	11,600	31
8MF005	Fraser River at Hope, British Columbia.	83,800	96,290	144,065	79	+106	214,000	138,300	30

[1] Adjusted.
[2] Records furnished by Corps of Engineers.
[3] Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[4] Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[5] Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

DISSOLVED SOLIDS AND WATER TEMPERATURES FOR MAY 1983 AT DOWNSTREAM SITES ON SIX LARGE RIVERS

Station number	Station name	May data of following calendar years	Stream discharge during month	Dissolved-solids concentration during month[a]		Dissolved-solids discharge during month[a]			Water temperature during month[b]		
			Mean (cfs)	Minimum (mg/L)	Maximum (mg/L)	Mean	Minimum	Maximum	Mean in°C	Minimum, in°C	Maximum, in°C
						(tons per day)					
	NORTHEAST										
01463500	Delaware River at Trenton, N.J. (Morrisville, Pa.)	1983	19,270	76	93	4,340	2,960	7,410	15.0	13.0	18.5
		1945–82	14,660	50	123	.....	930	12,500	....	10.0	28.5
		(Extreme yr)	[c]12,650	(1946)	(1978)		(1965)	(1968)			
04264331	St. Lawrence River at Cornwall, Ontario, near Massena, N.Y. median streamflow at Ogdensburg, N.Y.	1983	274,900	166	167	123,000	41,600	135,000	9.0	7.0	12.5
		1976–82	292,300	165	167	131,000	109,000	153,000	9.0	4.0	13.0
		(Extreme yr)		(1977, 1979–80)	(1980, 1981–82)		(1981)	(1976)			
			[c]278,300								
	SOUTHEAST										
0728900	Mississippi River at Vicksburg, Miss.	1983	1,599,000	183	222	833,000	756,000	954,000	18.5	14.5	21.5
		1976-82	739,700	178	290	428,000	176,000	838,000	20.0	14.5	26.0
		(Extreme yr)		(1977)	(1982)		(1977)	(1979)			
			[c]832,200								
	WESTERN GREAT LAKES REGION										
03612500	Ohio River at lock and dam 53, near Grand Chain, Ill. (25 miles west of Paducah, Ky.; streamflow station at Metropolis, Ill.)	1983	*900,000	124	156	.....	272,000	335,000	....	14.0	19.0
		1955-82	336,500	156	287	.....	25,500	309,000	....	6.5	25.0
		(Extreme yr)		(1976)	(1979)		(1976)	(1978)			
			[c]296,000								
	MIDCONTINENT										
06934500	Missouri River at Hermann, Mo. (60 miles west of St. Louis, Mo.)	1983	209,000	235	385	185,000	152,000	272,000	17.0	14.0	19.0
		1976–82	101,500	211	520	91,800	44,500	191,000	19.0	13.0	24.5
		(Extreme yr)		(1978)	(1981)		(1977)	(1982)			
			[c]92,040								
	WEST										
14128910	Columbia River at Warrendale, Oreg. (streamflow station at The Dalles, Oreg.)	1983	303,000	93	103	78,700	61,200	102,000	13.0	12.0	16.5
		1976–82	256,000	67	144	66,300	37,500	100,000	12.5	10.5	15.0
		(Extreme yr)		(1976)	(1977)		(1977)	(1976)			
			[c]427,700								

[a]Dissolved-solids concentrations when not analyzed directly, are calculated on basis of measurements of specific conductance.
[b]To convert °C to °F: [(1.8 X°C) + 32] = °F.
[c]Median of monthly values for 30-year reference period, water years 1951–80, for comparison with data for current month.
*Dissolved-solids records are for the first 17 days of the month.

INVESTIGATION OF TRENDS IN FLOODING IN THE TUG FORK BASIN OF KENTUCKY, VIRGINIA, AND WEST VIRGINIA

The abstract and illustrations below are from the report, *Investigation of trends in flooding in the Tug Fork basin of Kentucky, Virginia, and West Virginia*, by Robert M. Hirsch, Arthur G. Scott, and Timothy Wyant, U.S. Geological Survey Water Supply Paper 2203, 37 pages, 1982. This report may be purchased for $4.75 from Eastern Distribution Branch, Text Products Section, U.S. Geological Survey, 604 S. Pickett St., Alexandria, VA 22304 (check or money order payable to U.S. Geological Survey); or from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402 (payable to Superintendent of Documents).

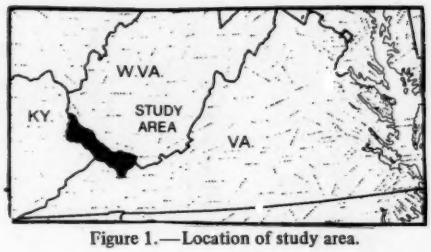


Figure 1.—Location study area.

ABSTRACT

Statistical analysis indicates that the average size of annual-flood peaks of the Tug Fork (Ky., Va., and W.Va.) has been increasing. (See figures 1, 2.) However, additional statistical analysis does not indicate that the flood levels that were exceeded typically once or twice a year in the period 1947–79 are any more likely to be exceeded now than in 1947. Possible trends in stream-channel size also are investigated at three locations. No discernible trends in channel size are noted. (See figure 3.) Further statistical analysis of the trend in the size of annual-flood peaks shows that much of the annual variation is related to local rainfall and to the "natural" hydrologic response in a relatively undisturbed subbasin. However, some statistical indication of trend persists after accounting for these natural factors, though it is of borderline statistical significance. Further study in the basin may relate flood magnitudes to both rainfall and to land use.

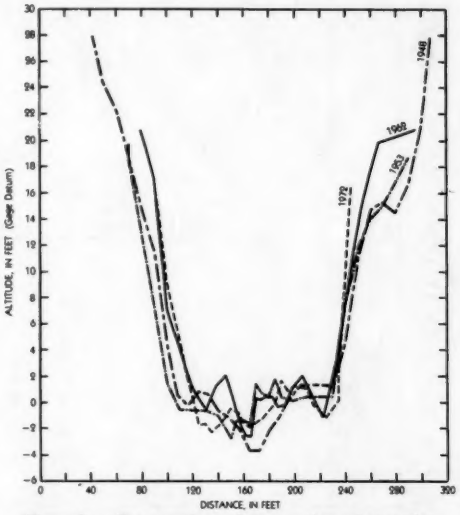


Figure 3.—Cross sections of stream channel at station 03214000 Tug Fork at Kermit, W. Va.

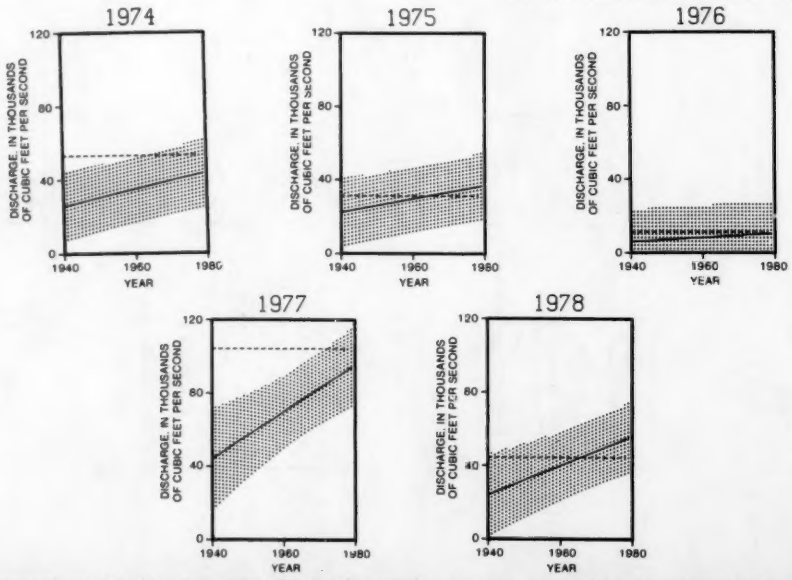


Figure 2.—Estimated trend in Tug Fork annual-flood peaks near Kermit, W.Va., given 1974–78 meteorological conditions. The dashed lines show the actual 1974–78 annual-flood peaks near Kermit. The solid lines show regression model estimates of the flood that would have occurred each year, 1940–80, for the given meteorological conditions. The dotted area shows the 95-percent confidence intervals for the regression estimates.

NATIONAL WATER CONDITIONS

MAY 1983

Based on reports from the Canadian and U.S. Field offices; completed June 10, 1983

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Hai C. Tang, Associate Editor
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COPY PREPARATION
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GRAPHICS
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The National Water Conditions is published monthly. Subscriptions are free on application to the National Water Conditions, U.S. Geological Survey, MS 420, Reston, Virginia 22092.

EXPLANATION OF DATA

Cover map shows generalized pattern of streamflow for the month based on 18 index stream-gaging stations in Canada and 164 index stations in the United States. Alaska and Hawaii inset maps show streamflow only at the index gaging stations that are located near the points shown by the arrows.

Streamflow for the current month is compared with flow for the same month in the 30-year reference period, 1951–80. Streamflow is considered to be *below the normal range* if it is within the range of low flows that have occurred 25 percent of the time (below the lower quartile) during the reference period. Flow is considered to be *above the normal range* if it is within the range of the high flows that have occurred 25 percent of the time (above the upper quartile).

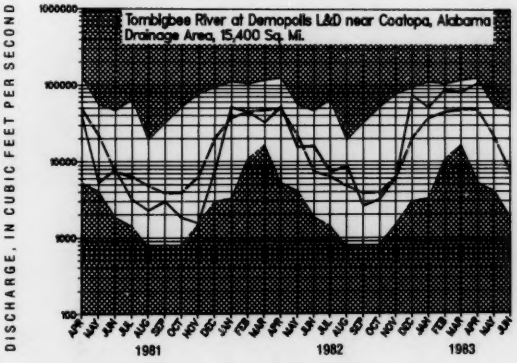
Flow higher than the lower quartile but lower than the upper quartile is described as being *within the normal range*. In the National Water Conditions, the median is obtained by ranking the 30 flows for each month of the reference period in their order of magnitude; the highest flow is number 1, the lower flow is number 30, and the average of the 15th and 16th highest flows is the median. One-half of the time you would expect the flows for the month to be below the median and one-half of the time to be above the median.

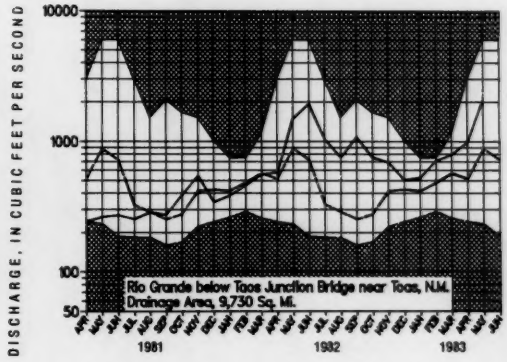
Statments about *ground-water levels* refer to conditions near the end of the month. The water level in each key observation well is compared with average level for the end of the month determined from the entire past record for that well or from a 30-year reference period, 1951–80. *Changes in ground-water levels*, unless described otherwise, are from the end of the previous month to the end of the current month.

Dissolved solids and temperature data for May are given for six stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). Dissolved solids are minerals dissolved in water and usually consist predominantly of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. Dissolved-solids discharge represents the total daily amount of dissolved minerals carried by the stream. Dissolved-solids *concentrations* are generally higher during periods of low streamflow, but the highest dissolved-solids *discharges* occurr during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at time of low flow.

SURFACE WATER – MONTHLY MEAN DISCHARGE IN KEY STREAMS

Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951–80. Heavy line indicates mean for current period.





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